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EXAMINER

BROOKE, MICHAEL S

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2853

DATE MAILED: 02/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/647,367

Applicant(s)

YONEYAMA ET AL.

Examiner

Michael S. Brooke

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 19-21, 26-30 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14-18 and 22-25 is/are rejected.
- 7) ☒ Claim(s) 12 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of species 1A and 2A in the reply filed on 11/08/04 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 19-21, 26-30 and 32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/08/04.

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms that are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

- In case the recording medium is a paper or the like which is not affected by the temperature, especially any problems are not caused. (p. 2, 2nd paragraph)

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- Further, it is possible to prevent that the cationic polymerization ink is not cured sufficiently by irradiating UV radiation of high irradiation to the ink. (p. 2, 2nd paragraph)
- More specifically, carrying section carries the recording medium 99 intermittently in time with movement of the carriage 4a as follows, that is, carries and stops carrying the recording medium 99 continuously. (p. 15, 3rd paragraph)
- When the piezoelectric element 2b is driven in the state ink is liquid...(p. 19, 2nd paragraph).
- The UV radiation source 6 can apply a low-pressure mercury lamp...(p. 23, 1st paragraph)

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: AN INK JET PRINTER AND IMAGE FORMING METHOD USING A HUMIDITY DETECTOR TO CONTROL THE CURING OF AN IMAGE.

Claim Objections

Claims 1-32 are objected to because of the following informalities:

- The claims are replete with grammatical errors and non-idiomatic language.

Appropriate correction is required.

- In claim 7, the language “ wherein the maximum limited irradiation is any lower irradiation of irradiation determined...” does not make sense. It appears that the Applicant is trying to say that the maximum irradiation is based upon electricity consumption, etc.
- Claim 12 recites, “wherein the central processing unit of the controller informs of abnormality of at least one humidity environment and a light irradiation condition when determining that the desired irradiation calculated based on the detected humidity is lower than the maximum limited irradiation.” This is not correct. Looking at Fig. 7, it can be seen that the abnormal warning is generated when **both** the humidity and the light irradiation condition are abnormal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 15, 16, 18, 24, 25 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (6,523,948) in view of Laskin et al. (6,232,361).

With respect to claims 1 and 18, Matsumoto teaches:

- An ink jet recording head (23) that ejects UV curable ink.
- A light irradiation section for irradiating the ink (Fig. 19).

- A humidity detecting section (S2) for detecting the humidity around the recording medium.
- A controller (31) for controlling the irradiation of the light on the basis of the detected humidity. (See col. 12:25-39, which discusses controlling output of drying units based upon humidity detected by humidity sensor, col. 13:37-59, which discusses control of IR diodes based on humidity and col. 14:39-56, which discusses control of UV light based on humidity.)

With respect to claim 2, the controller generates data for controlling the output of the UV lights, based upon the detected humidity. Matsumoto further discloses that the amount of irradiation the UV lights may be varied either by changing the intensity of the output or by changing the duty time (operation time). (col.13:51-55)

With respect to claims 3 and 4, the controller has a conversion table (63).

With respect to claim 5, the controller has a CPU and performs the calculation for determining the desired UV output.

With respect to claims 15 and 16, the light irradiation section irradiates light for a desired amount of time.

With respect to claim 24, the humidity sensor is provided at a distance capable of detecting humidity around the ink in a carrying direction of the recording medium. (Fig. 1 illustrates that the humidity sensor [S2] is disposed downstream of the print head [23])

Matsumoto teaches the claimed invention with the exception of:

- An ink including a cationic curable component.

- A plurality of humidity sensors.

Laskin teaches an UV curable ink containing a cationic polymerizable component. This ink provides the advantages of insensitivity to humidity, low viscosity and low odor. (col. 2:13-16)

It would have been obvious to one of ordinary skill in the ink jet art, at the time the invention was made, to have provided Matsumoto with the UV curable ink of Laskin, for the purposes disclosed therein.

With respect to claim 25, Matsumoto teaches providing a humidity sensor. It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided a plurality of humidity sensors, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art (St. Regis Paper Co. V. Bemis Co., 193 USPQ 8). In this case, the provision of multiple sensor would allow for a more accurate detection of the humidity, by averaging the humidities measured by multiple sensors.

The steps of the method of claim 31 are rendered obvious in view of the functions of the combination discussed above.

Claims 6, 7, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (6,523,948) and Laskin et al. (6,232,361), as applied to claims 1-5, 15, 16, 18, 24, 25 and 31 above, and further in view of Richmond (4,033,263).

Matsumoto, as modified, teaches the claimed invention with the exception of :

- The controller determining whether the calculated irradiation is not lower than the maximum limited irradiation by calculating the desired irradiation. (cl. 6)
- The maximum limited irradiation is determined on the basis of electricity consumption of the light irradiation section and irradiation determined on the basis of life span of the light irradiation section within irradiation of UV radiation capable of being irradiated to the recording medium without shrinking and distorting the recording medium. (cl. 7)
- The controller raises irradiation to the desired irradiation and determines the desired irradiation time when determining that the desired irradiation calculated based on the detected humidity is lower than the maximum limited irradiation. (cl. 14)

Richmond teaches a web dryer utilizing a UV lamp to cure a UV curable ink. Densitometer sensors are provided to measure the amount of smudging of the printed image. The UV lamp is controlled based upon the output of these sensors. In this way, the output of the UV lamp may be maintained at an optimum level for effective curing, while conserving electric power and increasing the effective life of the lamp by operating the same at reduced power levels when possible. (col. 8: 15-48). Thus, in summary, Richmond teaches optimizing the output of the UV lamps based on various factors, such as the cure rate of the ink, power consumption, the temperature at which the medium scorches etc.

It would have been obvious to one of ordinary skill in the ink jet art, at the time the invention was made, to have provided Matsumoto, as modified, with a controller that determines whether the calculated irradiation is not lower the maximum limited irradiation by calculating the desired irradiation, wherein the maximum limited irradiation is determined on the basis of electricity consumption of the light irradiation section and irradiation determined on the basis of life span the light irradiation section within irradiation of UV radiation capable of being irradiated to the recording medium without shrinking and distorting the recording medium and that raises irradiation to the desired irradiation and determines the desired irradiation time when determining that the desired irradiation calculated based on the detected humidity is lower than the maximum limited irradiation, as suggested by Richmond.

Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (6,523,948), Laskin et al. (6,232,361) and Richmond (4,033,263), as applied to claims 6, 7, 14 and 17 above, and further in view of Conwell et al. (6,350,071).

Matsumoto, as modified, teaches the claimed invention with the exception of the conversion table being determined on the basis of the sensitivity of the ink to the light.

Conwell teaches that it is well known to use different filters or lamps in order to ensure that the wavelength of the light matches the photo initiator chemistry.

It would have been obvious to one of ordinary skill in the ink jet art to have provided the look-up table of Matsumoto, as modified, with information regarding the

sensitivity of the ink to the light in order to ensure that the proper wavelength is used for the photo initiator, as taught by Conwell.

With regard to claim 10, since the controller of Matsumoto, as modified, stores information controlling the output of the UV light source in a look-up table, it would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have stored the information concerning the energy outputs for the different types of ink in the look-up table.

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (6,523,948), Laskin et al. (6,232,361) and Richmond (4,033,263), as applied to claims 6, 7, 14 and 17 above, and further in view of Mizoguchi et al. (6,179,418).

Matsumoto, as modified, teaches the claimed invention with the exception of the controller determining the maximum radiation based on the type of recording medium.

Mizoguchi teaches an ink jet printer having a heater (8) that is controlled based upon the type of recording medium that is being used. (col. 4:66-67 and col. 5:1-17). Controlling the output of the heater based on the type of recording medium enables the fixing of the ink to be optimized for the particular recording medium.

It would have been obvious to one of ordinary skill in the ink jet art to have provided to enable the controller of Matsumoto to determine the maximum limited radiation based on the type of recording medium, in order to maximize the curing of the ink for each different type of recording medium, as taught by Mizoguchi.

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With regard to claim 11, since the controller of Matsumoto, as modified, stores information controlling the output of the UV light source in a look-up table, it would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have stored the information concerning the energy outputs for the different types of recording media in the look-up table.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (6,523,948) and Laskin et al. (6,232,361), as applied to claims 1-5, 15, 16, 18, 24, 25 and 31 above, and further in view of Schmitt (6,280,801).

Matsumoto, as modified, teaches the claimed invention with the exception of an irradiance of 0.1 to 50 mw/cm² or 51-3000 mw/cm².

Schmitt teaches UV curing printing inks using an irradiance of 1 to 100mw/cm². (col. 3:46-50) Using an UV curable ink and UV source having this irradiance allows the ink to be cured without producing excess heat. (col. 3:1-3)

It would have been obvious to one of ordinary skill in the ink jet art, at the time the invention was made, to have provided Matsumoto, as modified, with a light irradiation section having an irradiance of 0.1 to 50 mw/cm² or 51-3000 mw/cm², as taught by Schmitt, for the curing an ink without excess heat.

Allowable Subject Matter

Claims 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Furthermore, the objections listed in the Office Action must be corrected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 571 272-2142. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael S. Brooke
Primary Examiner
Art Unit 2853